

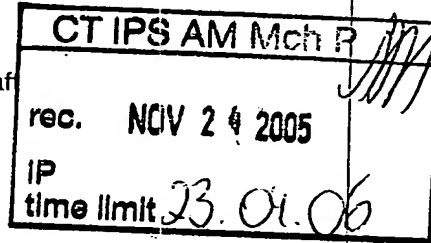
PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

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NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY

(PCT Rule 71.1)

Date of mailing
(day/month/year)

23.11.2005

Applicant's or agent's file reference
2003P17475WO

IMPORTANT NOTIFICATION

International application No.
PCT/GB2004/004854

International filing date (day/month/year)
18.11.2004

Priority date (day/month/year)
23.12.2003

Applicant
Roke Manor Research Limited et al

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international
preliminary examining authority:



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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2003P17475WO	FOR FURTHER ACTION		See Form PCT/PEA416
International application No. PCT/GB2004/004854	International filing date (day/month/year) 18.11.2004	Priority date (day/month/year) 23.12.2003	
International Patent Classification (IPC) or national classification and IPC H04B7/212			
Applicant Roke Manor Research Limited et al			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 1 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 21.10.2005		Date of completion of this report 23.11.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer Staeger, R Telephone No. +49 89 2399-8124 	

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

10/579775
IAP12 Rec'd PCT/PTO 18 MAY 2006
International application No.
PCT/GB2004/004854

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-9 as originally filed

Claims, Numbers

7-9 as originally filed

1-6 filed with telefax on 21.10.2005

Drawings, Sheets

1/11-11/11 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/GB2004/004854

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-9
	No: Claims	
Inventive step (IS)	Yes: Claims	1-9
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-9
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

V. Reasoned statement with regard to novelty and inventive step:

The invention relates to a method of communication in a TDD satellite communication system.

1. **In prior art** terrestrial TDD systems the TDD frames have guard periods which can be up to equal to the maximum round trip propagation delay in order to avoid interference between uplink and downlink under worst case conditions. Such a solution is not appropriate in satellite applications with the minimum round trip propagation delay being of order 240 msec.
2. **Problem:** To provide a TDD satellite communication method with high efficiency (minimal guard time) and low marginal delay (short TDD frame).
3. **Solution:**
A method of communication in a TDD satellite communication system, wherein
 - a. at any one terminal transmit and receive time slots are separated in time by a delay small compared to the round trip propagation delay
 - b. is used a TDD frame arrangement such that the propagation delay from satellite to terminal is not an exact number of multiples of frame length
 - c. if the TX time slot of one terminal overlaps in time with the RX time slot of another terminal, then those two terminals should be spaced apart in distance, such that interference between the two terminals is negligible.
4. None of the documents of the Search Report gives an indication to such a combination of method steps, wherein the disclosed slot and frame arrangement is used in combination with increasing the distance between two terminals up to a negligible interference between them when the transmit time slot of one terminal overlaps with the receive time slot of an other terminal. Such combination is also not considered as obvious.
5. **Basis for amendments:**
p.4, l. 5-6 and p. 5, l. 12-13.

VII Certain defects in the international application:

1. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1-D4 is not mentioned in the description, nor are these documents identified therein.
2. A document reflecting the prior art described in figures 1-3, is not identified in the description (Rule 5.1(a)(ii) PCT).
3. Independent claim 1 is not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case could be appropriate, with those features known in combination from the prior art (figures 1-3 or document D1) being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT). In case the one part is preferred it should be clear from the description which features of the claim are known from the prior art.
4. The description is not adapted to correctly reflect any changes in the scope of the claimed invention.
5. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

VIII Certain observations:

1. For reasons of clarity the applicants should have considered to replace in claim 1, line 13 the word "overlapped" by "overlaps" and to delete the word "path" in line 15.
2. Lines 11 to 14 of claim 1 lead to the impression that the claim covers merely the case that merely overlapping transmit time slot and receive time slot of terminals (one and another terminal) which are communicating with each other are taken into account. However in corresponding figure 8 this restriction cannot be seen. There seems to be possible an overlap of a transmit time slot and a receive time slot of terminals, which are not necessarily communicating with each other. Therefore this contradiction between claim and figure 8 results in an uncertainty whether the scope of claim is supported by figure 8 and related description.

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

International application No.

PCT/GB2004/004854

CLAIMS

1. A method of communication in a time division duplex (TDD) satellite communication system comprising at least one satellite and a plurality of terrestrial terminals; the method comprising allocating time division multiple access (TDMA) time slots for transmission between the satellite and any one of the plurality of terminals, such that for any given terminal, transmit time slots for transmission to the satellite and receive time slots for reception from the satellite are separated in time; wherein propagation delay is not an exact number of multiples of frame length; wherein an assigned time delay between transmit and receive time slots at the any one terminal is small compared with round trip propagation delay; and wherein, when the transmit time slot for one terminal causes a transmission from that one terminal to be received at another terminal overlapped in time with a receive time slot allocated for the other terminal, then those two terminals are spaced apart in distance, such that an interference path between the two terminals is negligible.
2. A method according to claim 1, wherein signals between the terminals and the satellite are synchronised at the satellite.
3. A method according to claim 1 or claim 2, wherein alternate time slots at the satellite are used for transmission and reception.
4. A method according to at least claim 2, wherein the terminals use navigational information to estimate their propagation delay to the satellite; and thus to determine the time required to transmit into an allocated time slot.
5. A method according to claim 4, wherein the satellite transmits ephemeris data to the terminals to aid in determining the propagation delay.
6. A method according to any preceding claim, wherein the position of each terminal is determined by the satellite, using location data provided by each terminal.